Economic terms and conditions of network interconnection are just as important as technical considerations in promoting efficient operation of a "network of networks."[61]

Heretofore, interconnection has been carried out under a reciprocal compensation regime, in which local carriers compensate each other, usually at comparable rates, for completion/termination of calls. This scheme has two major shortcomings: (1) it affords powerful economic incentives for carriers to be "net terminators" of traffic and to deploy facilities uneconomically to "game" the compensation arrangements; and (2) it affords powerful economic incentives for carriers to invest scarce resources in a socially unproductive effort to acquire "carrier" status and the benefits arbitrarily associated therewith.

One premise of the current reciprocal compensation regime, widely recognized at the time of its inception, was that traffic between interconnecting carriers would be balanced. As historical experience with international compensation arrangements amply illustrates, unbalanced traffic (historically the result of earlier economic reforms in the U.S. than in many foreign countries) produces a huge money "hemorrhaging" as foreign regimes are able to extract economic "tribute" in the form of charges for call termination.[62] What the government failed to recognize in adopting reciprocal compensation for local network interconnection is that such a scheme affords a powerful dynamic in the direction of unbalanced traffic. So even if traffic starts out balanced, "gaming" of the compensation arrangements for economic gain will quickly produce unbalanced traffic patterns. This is precisely what happened.

The best known (but by no means the only) scam involved CLEC/ISP combinations, which as terminators of Internet connections were able to reap huge windfalls. Two aspects of these arrangements are worth noting: (1) from the standpoint of network functionality, the deployment of a CLEC switch "in front of" an ISP was often completely redundant in the specific sense that it did not "replace" the ILEC's switch—by switching the call twice, intercarrier compensation kicked in but there were no resource savings (*i.e.*, no productive "value-added"). Thus the effect of the scheme's operation was to promote resource waste; and (2) in the absence of effective price discrimination between basic ratepayers who are or are not net traffic "exporters," the operation of this regime redistributes economic benefit to ISP users and away from "the little old lady in tennis shoes." Were ISPs compelled to bear costs of terminating their customers traffic directly, their incentives to minimize costs to minimize ISP service charges would be greater and, thus, their incentive to deploy (through affiliated CLECs) functionally redundant switches minimized. At the same time, direct charging would prevent the "offloading" of costs on

[61] J. Haring and J. H. Rohlfs, "Efficient Competition in Local Telecommunications without Excessive Regulation," *Information Economics and Policy*, Vol. 9, No. 2, pp. 119-131 (June 1997); *see* also J. Haring and J. H. Rohlfs, "Telecommunication Pricing and Competition," *Interconnection and the Internet: Selected Papers from the 1996 Telecommunications Policy Research Conference*, G. Rosston and D. Waterman, eds., (Lawrence Erlbaum Associates: 1997).

[62] When traffic is balanced, the level of compensation matters little since the reciprocal amounts "cancel." When traffic is/becomes unbalanced, the level of compensation matters a lot.

unsuspecting non-ISP users in charges for basic local service and compel ISP user/cost-causers to be cost-bearers.

Good economic arrangements, whether governmentally or market-based, operate to *internalize* costs and compel cost-causers to be cost-bearers. In this way, they work to produce an efficient (*i.e.*, economic welfare-maximizing) allocation of resources and to afford incentives for cost minimization. The current regime, in contrast, produces powerful incentives to *externalize* costs, *i.e.*, to offload costs on others. So-called "carrier" status not only entitles an entity to compensation for call termination, but also to acquire costly interconnection facilities free of charge.[63]

Again, whatever one's views about the productive efficacy or equity of these arrangements, it is important to recognize the effects they have on efficient facilities deployment. To the extent regulation affords a means of "socializing" costs and relieving cost-causers from responsibility to be the cost-bearer, it reduces incentives for investment in facilities deployment. It is unrealistic to believe that "everyone can live off everyone else,"[64] but to the extent that regulatory arrangements lead economic actors to think they can, they will attempt to do so.

There is, of course, a light on this particular horizon: The FCC has opened an extremely important and well-conceived intercarrier compensation reform proceeding.[65] Much of the criticism of the Commission's proposed approach is, in our view, misconceived: It does not suffice for regulation to ensure that prices reflect costs, if costs are inflated and products that consumers would prefer to purchase are not available. The current regime provides powerful incentives for firms to incur costs redundantly and to offload costs on non-users who suffer harm unless regulation is perfect—hardly a realistic prospect. The FCC staff's proposals go a long way toward remedying these problems, but they need to be adopted and implemented to have these salutary effects.

A final point: We would again stress the problem of piece-meal improvements. Piece-meal improvements may (because of problems derived from the economic theory of second-best) not represent actual improvements unless all relevant sources of inefficiency are addressed. As long as rate rebalancing and subsidy reform issues remain unaddressed, it is important to reflect this unfortunate state of affairs in the architecture of intercarrier compensation arrangements. We believe the Commission's proposals represent a potentially major improvement, *if* they are

[63] Having acquired "carrier" status, paging companies are, for example, able to offload costs from their subscribers and impose interconnection facilities costs on telephone ratepayers. Sufficiently discriminatory pricing (an implausible hypothetical) could, in principle, confront users who call paging company numbers higher rates to reflect the costs of interconnecting such facilities. In the absence of such price discrimination, basic rate payers bear part of the costs of paging service.

[64] This is the French philosopher Bastiat's definition of the state.

[65] *In the Matter of Developing a Unified Intercarrier Compensation Regime*, CC Docket No. 01-92, *Notice of Proposed Rulemaking* (April 19, 2001).

implemented properly taking appropriate account of the actual state of pricing reform and subsidy rationalization.[66]

5.3. RATE REBALANCING

We have saved the "toughest nut" until last. Unfortunately, the toughest nut is also, arguably, the most important one to crack. Unless government policy comes to effective grips with the problem of unbalanced rates, the prospects for success in achieving the objectives of TA96 will surely remain slim. The fundamental problem is that the price of the service where competition is supposed to be promoted is held below cost to promote "universal service."

We have argued that the issue of the degree of required unbundling has been confounded with pricing issues, with uneconomic pricing of both inputs and outputs providing incentives for competitors to press for many extreme and uneconomic forms of unbundling. Part of the pressure on the input pricing regime no doubt stems from failures to get output prices right. If local service (including the subscriber line rental) is priced below cost, whether literally or relative to what efficient cost-recovery considerations would dictate,[67] it will obviously be difficult to compete using network elements priced *at* cost. In this circumstance, there will be (and certainly has been) a great deal of pressure to adopt questionable theoretical conceptions of relevant costs and to entertain "low-ball" measurements of them. The trouble is that this tack is neither viable (ILECs, alas, do not possess the power to print money and thus sustain losses from selling below-cost elements to compete with services priced below cost to satisfy regulatory objectives) nor consistent with evolution of self-policing, facilities-based competition.

Instead of trying to create bizarre new UNEs or UNE combinations (*viz.*, UNE-Ps and EELs whose *raison d'être* is simply to "open a second, lower-price window") at uneconomic prices administered by regulation, the required fundamental reform is rate rebalancing and subsidy scheme rationalization. As long as the "safety valve" is perceived to be identification of ever more extreme definitions of "essential" unbundled elements and specification of ever more uneconomic element and element bundle prices, the chances for genuine facilities-based competition are necessarily limited.

Perhaps the most important reason the U.K. authorities have had greater success in promoting facilities-based local competition is that, in contrast to the U.S., the U.K. has a unified regulatory authority, *i.e.*, a single rather than "state" and "federal" regulator. The regulator has been able to afford BT a modicum of flexibility to rebalance rates, and BT has taken almost maximum

[66] In particular, the disparities among local termination, intrastate access and interstate access need to be resolved, while efficient rate structures to cover the fixed and shared network costs need to be in place.

[67] W.J. Baumol and J. Gregory Sidak, *Toward Competition in Local Telephony*, MIT Press and American Enterprise Institute for Public Policy Research, 1994. *See* also J. Rohlfs, "Economically-Efficient Bell System Pricing," Bell Laboratories, Murray Hill, New Jersey, 1978. Efficient Ramsey pricing requires that the prices of services be marked up in inverse proportion to price elasticities of demand, taking account also of relevant demand complementarities and substitution relations.

advantage of this flexibility to do so. Rates have *not* been fully rebalanced in the U.K., but they have been substantially rebalanced—sufficiently so that competitors have been willing to *sink* very substantial investments in competing local facilities.[68]

In the U.S., the political economic reason rates became unbalanced in the first place is the same reason they have been difficult to rebalance. Historically, AT&T bought peace with state regulators by maintaining low local rates, funded by long-distance rates maintained above falling costs, the result of technical advances in long-distance call transmission. State regulators do not "get credit" for falling long-distance rates, and might not want to claim credit in any event if higher local rates (their "responsibility") are the price to be paid for lower long-distance rates.

As we have discussed elsewhere,[69] part of the problem is precisely the perceived tension (rightly perceived, given the limited operating flexibility) between (just) these two rates. We have previously formally "sworn off" advising regulators to take firm grasp of the regulatory "third rail" of rate rebalancing.[70] Nevertheless, the adverse consequences for competition that flow from the perhaps natural unwillingness to grasp this nettle cannot be ignored.

In addition to affording some flexibility to actually raise line rental charges and other charges for local service, the U.K. authorities have also afforded BT considerable flexibility in terms of its ability to bundle basic service along with other service features and functionalities. BT has, of course, never been subject to a long-distance line-of-business restriction, so its ability to offer "package offerings" includes the ability to bundle long-distance calling. This marketing flexibility offers a useful tool for addressing the difficult cost recovery issue because it enables the recovery effort to be diffused over many services, rather than focused solely on long-distance rates.

If direct progress in rebalancing is impossible or can occur only at a glacial pace, then LECs need to be afforded substantial flexibility to rebalance rates through customer self-selection from among a multiplicity of carefully calibrated packaged service offerings.

Finally, we think it is simply dishonest for regulators to look to fund socially mandated rates and safety-net offerings through cross-subsidization from ILEC service offerings and, simultaneously, to undercut the viability of such an approach by offering CLECs access to ILEC

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[68] As is well recognized, the comparatively late introduction of cable television in the U.K. (where satellite was earlier introduced and remains the dominant MVPD) has provided a convenient context for development of a facilities-based competitor to BT.

[69] H. M. Shooshan and J. Haring. *Cutting the Gordian Knot of Rate Rebalancing,* prepared for the *29th Annual Conference of the Institute of Public Utilities, "Reconciling Competition and Regulation,"* Williamsburg, Virginia, December 5, 1997.

[70] *Op. cit.* "This paper is not meant to be yet another clarion call for regulators to electrocute themselves by enthusiastically grabbing hold of the figurative third rail. William Baumol once remarked that if something is not feasible, it *cannot* be optimal."

service capabilities under terms and conditions that undermine the requisite funding. By all means, make subsidies (and the associated taxes) explicit, but, failing to do so, at least recognize that "there is no such thing as a free lunch."

6. CONCLUSIONS

As is widely agreed, regulation is a highly imperfect "remedy" preferably to be avoided where feasible. Most agree that it would be better if competition were sufficiently effective to permit the market to police itself. Regulation has not inconsiderable direct costs and often quite considerable indirect costs, and the regulatory process is often subject to abuse and misuse—frequently thwarting rather than enhancing effective competition. While there is a limited role for regulatory rules to promote the evolution of effective competition—*e.g.*, rules requiring interconnection of competing networks—competition too heavily premised on regulation, what Alfred Kahn has referred to as "regulated competition," more closely resembles effective industry cartelization. It entails the mollifying of contesting industry factions *by regulation*, rather than the *substitution* of a competitive market discovery process as the primary means by which decisions about efficient resource allocation are to be rendered.

Moreover and importantly, regulated competition depends on continued (and usually expanding) regulation and is inconsistent with *de*regulation. The goal of competitive reforms in telecommunications is substitution of competition for regulation (thereby creating more consumer choice, more efficient pricing and greater innovation), not substitution of regulated competition for regulation. The competition that is a predicate for thoroughgoing deregulation is facilities-based competition, not resale or repackaging-based competition. The existence of the latter certainly justifies retail deregulation, but depends on continued wholesale regulation. By the same token, facilities-based competition for particular network component elements (say, switching or transport) surely justifies wholesale *de*regulation.

If the Commission truly desires welfare-enhancing, facilities-based competition that maximizes real customer choice and justifies and permits deregulation, it must take especial care to ensure that economic incentives are properly calibrated to supply incentives for efficient network facilities-deployment by *both* incumbent and new competitors. It does not suffice to "talk the talk" of the importance and primacy of facilities-based competition unless the talk is buttressed by actually "walking the walk" in terms of formulation of regulatory policies that promote rather than detract from incentives to invest and build.

Heretofore, implementation of the TA96 has, in our view, involved a variety of errors of both commission and omission that have had the consequence of dissipating investment incentives or, in the case of the reciprocal compensation regime, affording inefficient mis-incentives for facilities-deployment. The unbundling regime and the pricing scheme adopted to inform the setting of charges for elements has operated to deter productive investments in two ways: (1) it has skewed entrants' "make-or-buy" decisions against facilities deployment and encouraged ever more extreme unbundling demands, no matter how uneconomic in terms of the calculus of actual

costs and benefits; and (2) it has deterred capital investments by incumbent exchange carriers by severely attenuating prospective economic returns.

A commonplace in both the antitrust and 'law & economics' professional literature is the idea that indiscriminately forcing access to private property can seriously reduce incentives to create, maintain and improve such assets.[71] In economic terms, unbundling poses the issue of if and, if so, when there should be an exception to the generally accepted principal that one has a right to keep one's creations to oneself.[72]

The unbundling criterion of the TA96 turns on the issue of whether access is necessary and lack of access impairs competition. When there are alternatives to shared use of an element readily at hand, whose exploitation is not difficult, it is hard to reckon how access can be intellectually coherently maintained to be "necessary." In this circumstance, there is no economically valid instrumental sense in which access, given effective alternatives, can be concluded to be necessary. Nor is it clear, assuming effectiveness of alternatives, how lack of access could "impair" competition is this circumstance.

This is not to imply that judgments about "effectiveness" of alternatives and the "readiness" of their availability do not supply a legitimate basis for argument and difference of opinion. But it is important, in making such assessments, to comprehend the potential for *two* different kinds of potential failures: at the relevant policy margin, there are economic tradeoffs between facilities- and service-based competition and, thus, more of one necessarily means less of the other. So government decisionmakers must *optimize* this tradeoff. Our critique is that the government, heretofore, has erred in failing to reckon adequately the adverse effects of its unbundling decisions at the margin, with the result of having actually set back facilities-based competition.

Alternatives to ILEC "switching" and "transport" elements are, as we and others have documented, readily available and, in our view, so readily available that it is impossible to see how lack of access to ILEC-supplied "switching" in all areas and "transport," particularly in areas where the ILEC has been afforded pricing flexibility, could plausibly be maintained somehow to "impair" competition. At the same time, we note with Professor Kovacic, that "[f]irms often will be motivated by a desire to gain access to competitively valuable assets at *prices that do not reflect the true costs of access.*"[73] In our view, this kind of situation is

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[71] For example, Judge Richard Posner writes that:

> The creation of *exclusive* rights is a necessary rather than sufficient condition for the efficient use of resources...The more exclusive the property right, the greater the incentive to invest the right amount of resources in the development of the property.

See The Economic Analysis of Law (1972), pp. 10-12.

[72] Thus one's incentive to save and invest in a house would be severely attenuated, were home ownership not to include the right to exclude others from living there.

[73] *See op. cit.* (emphasis added).

precisely one where compelling shared access dissipates investment incentives. It dissipates CLEC incentives to make their own network facilities or make use of non-ILEC facilities; it dissipates ILEC incentives to upgrade networks and develop new service capabilities (say, broadband) because it attenuates prospective rewards and discourages risk taking. To the extent that CLECs respond to this disincentive, competition will be limited to a relatively small portion of total value-added. To the extent that ILECS respond to this disincentive, the Commission will be writing-off some of the potentially largest contributors to technological advance and future productivity advance.

If the Commission is serious about fostering facilities-based competition, it needs to be much more sensitive to the issue of and need for economic incentives. That not only means taking a hard look at the issue of unbundling, both of existing and prospective new service capabilities, but reconsidering the adverse consequences of existing pricing policies, both of inputs and outputs. The FCC's costing standard, dubbed "TELRIC-*BS*" by no less an authority than economist Alfred E. Kahn, one of the world's leading students of regulation and the intellectual godfather of *de*regulation, is economically unsound—indeed, in our view, nonsensical. Prices are being based not on incremental costs that might conceivably accrue in this world, but on an entirely artificial construct. Similarly, the FCC's total reliance on bottom-up cost estimation methods, with no real-world validation, is an indefensible methodology that is likely to seriously underestimate costs. We reiterate that if the Commission makes it (overly) cheap to buy, competitors—whether CLEC or ILEC—cannot be reasonably expected to build, and building is what produces facilities-based competition and an intellectually, legally, economically and politically compelling rationale for full-blown, thoroughgoing deregulation.

The Commission's current policy, with its primary focus on regulatory management of service-based competition through various commands and levies, provides no exit strategy for regulation. On the contrary, regulation will be needed for the indefinite future to police the pricing of what appears to be an ever-expanding collection of UNEs and combinations thereof. The outcome is all the more ironical as it comes simultaneously with the rapid growth and price declines for wireless services, which *diminish* the need for ILEC regulation—apart from regulatory overview of network interconnection arrangements.

We applaud the Commission's having undertaken an effort to reform the current intercarrier compensation arrangements, which are certainly in dire need of reform. But reforms must obviously be implemented to produce salutary effects. Even then, reforms do not guarantee economic welfare gains if they are undertaken on a piece-meal basis or fail to reflect *failures* to proceed simultaneously along other relevant dimensions, *viz.*, rate rebalancing.

We think the simplest and best solution to the problems of unbalanced rates is to rebalance rates. That is not easily accomplished, but the British have been able to travel a long way by permitting greater pricing flexibility. We also think that significant progress can be made if ILECs are afforded maximum flexibility to package the maximum number of services (*i.e.*, including long-distance service) in bundled offerings, suitably priced to encourage customers to self-select more rebalanced alternatives.

Chairman Powell has stated that "*Facilities-based competition is the ultimate objective.*" The Commission needs to take greater care in promoting *non*-facilities-based methods of competition as "*useful interim steps*" lest it supply a seductive addiction that undermines incentives to deploy competitive facilities. In our view, competition is an important *instrumental* objective; the ultimate goal is to supply ample grounds for deregulation, not to increase already excessive demands for regulatory intervention and industry cartelization.

Attachment B

Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Review of the Section 251 Unbundling	)	
Obligations of Incumbent Local	)	CC Docket No. 01-338
Exchange Carriers	)	
	)	
Implementation of the Local Competition	)	
Provisions in the Telecommunications	)	CC Docket No. 96-98
Act of 1996	)	
	)	
Deployment of Wireline Services	)	
Offering Advanced Telecommunications	)	CC Docket No. 98-147
Capability	)	

UNE FACT REPORT 2002

Prepared for and Submitted by
BellSouth, SBC, Qwest, and Verizon

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APPENDICES

I. COMPETITIVE OVERVIEW

The Commission conducted its last comprehensive review of local exchange competition in 1999. Since that time, CLEC customer bases have been growing at significant rates, more than tripling in the last three years. ILECs are losing roughly an equal number of lines to wireless and cable networks as they are to wireline CLECs. At least 10 million wireline access lines already have migrated to wireless networks, and several million more have migrated to cable networks. For three years running, the number of lines served by ILECs has declined – a trend never witnessed before in a century of growth of telephone service. And competitive alternatives are available to far greater numbers than are actually subscribing today.

A. Competitive Facilities and Networks.

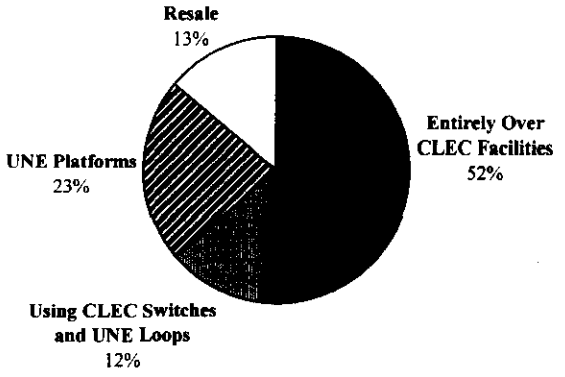
The competitive networks of CLECs, wireless carriers, and broadband providers have all grown significantly in the three years since the Commission conducted its last comprehensive UNE review. *See* Table 1. The number of cities with CLEC networks has increased by more than 70 percent, CLEC fiber has grown by more than 80 percent, CLEC circuit switches and packet switches have both nearly doubled, and buildings served by CLECs have more than tripled. *See id.* CLECs now serve more lines using entirely their own facilities (including their own local switches and loops) than they do by relying entirely on ILEC networks (through resale or the UNE Platform). *See* Figure 1. All of these figures are conservative, because they are drawn from public sources or from the necessarily limited data available to the BOCs.

Table 1. Competitive Networks

		YE 1998	YE 2001
Wireline CLECs	Cities with Voice Networks	540	930
	Circuit Switches	700	1,300
	Packet Switches	860	1,700
	Route Miles of Fiber (local and long-haul)	100,000	184,000
	Average Number of CLEC Networks in Top 100 MSAs	10	16
	Buildings Served (on- and off-net)	106,000	330,000
	Homes with access to cable telephony service	<2,000,000	>10,000,000
Wireless	% of population in counties with 3 or more wireless operators	n/a	>91
	% of population in counties with 5 or more wireless operators	n/a	>75
	Wireless Carriers Offering Data Services	2	7
Broadband	% of homes with access to cable modem service	20	66-77
	% of homes with access to two-way satellite	0	>90
	Markets with MMDS	0	58

Sources: See Appendix M.

Figure 1. Breakdown of CLEC Lines by Mode of Entry*



*The number of lines provided entirely over CLEC facilities and using CLEC switches is based on the number of E911 listings CLECs have obtained. Because the actual number of lines that CLECs are serving with their own switches is likely much higher, this method will, if anything, understate the percentage of all lines that CLECs are serving in whole or in part over facilities they have deployed themselves. The number of lines that CLECs are serving entirely over CLEC facilities was derived by subtracting the total number of stand-alone POTS loops from the total number of CLEC E911 listings.

Switches.[1] At the time of the last UNE review, CLECs had deployed approximately 700 traditional local circuit switches. Today, CLECs operate approximately 1,300 *known* local circuit switches. CLECs are now using their switches to serve no fewer than *16 million* local lines, and *likely closer to 23 million* local lines, a more than three-fold increase since 1998. CLEC switches are now so geographically widespread that they are being used to serve actual local customers in wire centers that contain approximately *86 percent* of the Bell companies' access lines.

CLECs are using their switches to serve mass-market customers as well as large business customers. As of year-end 2001, CLECs were serving at least *three million* residential lines using their own switches, and were offering service to millions more. Circuit-switched cable telephony has been deployed in 20 states and is now available to more than 10 million U.S. homes – approximately 10 percent of the mass market. Cable telephony is now available ubiquitously in some smaller states (*e.g.*, Cox service in Rhode Island) and to a large and growing fraction of homes in a number of larger states (*e.g.*, AT&T service in and around Pittsburgh, Boston, Chicago, and the Bay Area, and Cox service in San Diego, Orange County, and the Tidewater area of Virginia).

Packet and wireless switches are now placing significant, additional competitive pressure on the ILECs' traditional circuit switches. Some eight million users now have broadband cable or wireless data links that terminate directly on a competitive packet switch, bypassing ILEC circuit switches altogether. Since the last UNE review, the installed base of the CLECs' *known* packet switches has nearly doubled, from 860 to more than 1,700. The number of wireless subscribers has increased from about 69 million as of year-end 1998, to an estimated 130 million today. A rapidly growing number of subscribers are using wireless service as a substitute for second and additional lines, and some consumers have abandoned wireline service entirely in favor of wireless. And wireless switches are displacing *usage* on wireline switches even more

[1] *See* Section II.

rapidly. Wireless carriers have deployed hundreds of switches, which handle an estimated 12 percent of all U.S. phone calls.

Interoffice Transport.[2] It is clearly economical for competitors to run fiber-optic networks to a large fraction of ILEC wire centers. Since the time of the last UNE review, CLECs have increased their fiber networks from approximately 100,000 route miles to at least 184,000 route miles, and the majority of this fiber is used for local transport. The number of CLEC networks in the 150 largest MSAs – which encompass nearly 70 percent of the U.S. population – has grown from approximately 1,100 to approximately 1,800 in the last three years. Local fiber also is now being supplied to CLECs by carrier-agnostic wholesale suppliers, utility companies, and interexchange carriers. CLECs are now using their own fiber networks to capture between 28 and 39 percent of all revenues for special access services, which are provided through a combination of transport and high-capacity loops.

CLECs that provide competitive transport typically do so by collocating transmission equipment in an ILEC central office and connecting that equipment to their own fiber-optic network. This "fiber-based collocation" supplies the simplest and most unambiguous indicator of the extent of competition in the transport market. As of year-end 2001, one or more CLECs had obtained fiber-based collocation in BOC wire centers that contain more than half of all business lines served by the Bell companies. As of that same date, one or more CLECs had obtained fiber-based collocation in more than 60 percent of all BOC wire centers with more than 10,000 business lines. These figures are highly conservative because, with all the competitive fiber that has been deployed, a considerable amount of traffic also now bypasses ILEC wire centers completely.

High-Capacity Loops.[3] CLEC fiber networks now pass through a large number of commercial office buildings, which contain an even larger number of high-volume customers. CLECs now serve at least 156 million voice-grade equivalent circuits, the majority of which are provided over high-capacity lines. And CLEC fiber networks are now so extensive that they readily can be – and routinely are – extended as needed to pick up additional traffic from new, off-net customers. CLECs accordingly serve the vast majority of their customers using their own last-mile facilities. For example, CLECs serve between four and seven times more business customers over high-capacity fiber that the CLECs own themselves, than they do over loops obtained from ILECs. CLECs have purchased only 70,000 high-capacity loops in the four BOCs' regions combined. Virtually all of the high-capacity loops that CLECs have purchased are DS-1 loops; CLECs have purchased only 140 DS-3 loops, and not a single loop above the DS-3 level.

POTS Loops.[4] Technologies that compete directly against traditional POTS loops are rapidly being deployed across the country. Cable telephony services were available in only a few markets at the time of the last UNE review. Today, they have been expanded to the point where they are now offered to more than 10 percent of all U.S. homes; that figure is projected to

[2] *See* Section III.

[3] *See* Section IV.A.

[4] *See* Section IV.B.

rise rapidly over the next few years. As noted above, cable telephony is now available ubiquitously in some smaller states and to a large and growing fraction of homes in a number of larger states.

Wireless services compete much more significantly against wireline than they did at the time of the last UNE review. The quality of wireless services has improved significantly in the last three years, and prices have dropped dramatically. More than 90 percent of the U.S. population now lives in counties served by three or more mobile wireless operators; more than three-quarters of the population live in counties served by five or more. Two in five Americans have a mobile phone.

Broadband Loops.[5] Broadband loops represent an increasing share of all loops provided to mass-market customers – more than 6 percent as of year-end 2001. Broadband cable modem service is now available to more than two-thirds of the residential population. Cable operators serve more than twice the number of broadband subscribers as ILEC networks, and satellite and fixed wireless providers offer additional competition. Two satellite providers now offer two-way broadband service nationwide. Broadband wireless services also are much more widely available today than they were three years ago.

Interconnection of Competitive Networks and ILEC Networks. Since the last UNE review, CLECs have significantly increased the level of interconnection between their networks and ILEC networks, and the amount of traffic exchanged between them. *See* Table 2. The number of CLEC collocation arrangements has grown nearly six-fold since the Commission conducted the last UNE review. *See id.* End offices serving more than 80 percent of all BOC access lines now have one or more CLEC collocators.[6] The number of CLEC interconnection trunks has more than quadrupled since the last UNE review. *See* Table 2. Minutes of traffic exchanged on these trunks have increased by about five-fold. *See id.*

Table 2. Interconnection of CLEC and ILEC Facilities

	Collocation Arrangements		Interconnection Trunks		Minutes Exchanged	
	1998	**2001**	**1998**	**2001**	**1998**	**2001**
Verizon*	1,100	7,000	663,000	3.4 million	32 billion	193 billion
SBC**	2,000	9,900	541,000	3.1 million	23 billion	125 billion
BellSouth	870	4,700	326,000	1.3 million	21 billion	98 billion
Qwest	240	3,300	285,000	927,000	20 billion	78 billion
Total	**4,300**	**24,900**	**2 million**	**9 million**	**96 billion**	**493 billion**

Totals may not equal sum of parts due to rounding. *1998 collocation arrangements exclude the former GTE service area. Minutes exchanged data exclude CLEC-terminated minutes for the former GTE service area. **1998 minutes exchanged data exclude the Ameritech service area.

[5] *See* Section IV.C.

[6] *See* Section II.A, Table 10.

B. Competitive Lines Served.

Since the last UNE review, CLECs, wireless, and broadband providers have very significantly increased the number of customers and lines that they serve. *See* Table 3. There has been especially large growth in the number of lines that CLECs serve with their own facilities. By contrast, ILEC access lines have steadily declined in each of the last three years, an unprecedented trend in a century of steady annual growth. *See* Figure 2.

CLECs serve no fewer than 16 million lines and likely closer to 23 million lines – including approximately three million residential lines – wholly or partially over facilities they have deployed themselves, facilities that invariably include their own local switches.[7] These line totals represent a more than three-fold increase since 1998, and a more than thirty-fold increase in facilities-based residential lines. Many of the lines that CLECs serve are high-capacity lines; CLECs now serve at least 156 million voice-grade equivalent circuits.[8] CLECs also serve more than 9 million lines – including more than 5 million residential lines – via resale of ILEC service or through the UNE Platform. The corresponding figures three years ago were approximately 2.7 million CLEC lines, including 1.5 million residential lines. Today, the largest CLECs serve more than one million access lines each, and large numbers of CLECs serve 500,000 or more. *See* Figure 3.

Table 3. Competitive Lines/Subscribers

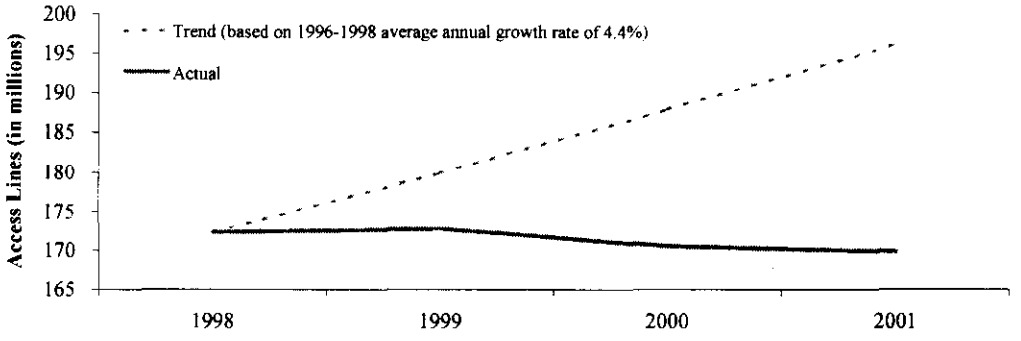
		YE 1998	YE 2001
Wireline CLECs	Facilities-Based Business Lines	5-6 million	13-20 million
	Facilities-Based Residential Lines	>80,000	3 million
	Resale/UNE-P Business Lines	1.2 million	3.8 million
	Resale/UNE-P Residential Lines	1.5 million	5.6 million
Wireless	Wireless Subs.	69 million	130 million
	Wireless Data Subs.	n/a	6.7 million
Broadband	Cable Modem Subs.	<300,000	7.5 million
	Fixed Wireless/Satellite Subs.	0	>200,000

Sources: See Appendix M.

[7] *See* Section II.A.

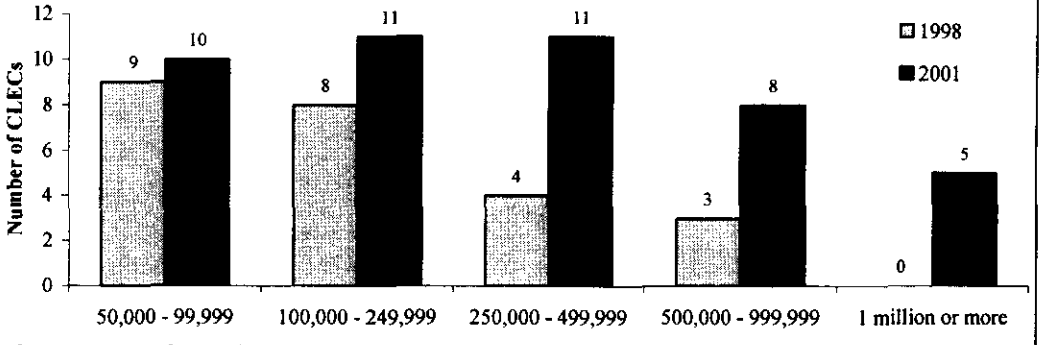
[8] *See* Sections II.A & IV.A; *see also* Table 4, *infra*, and Appendix A.

Figure 2. Decline of BOC Access Lines



Sources: Credit Suisse First Boston; FCC. *See* Appendix M.

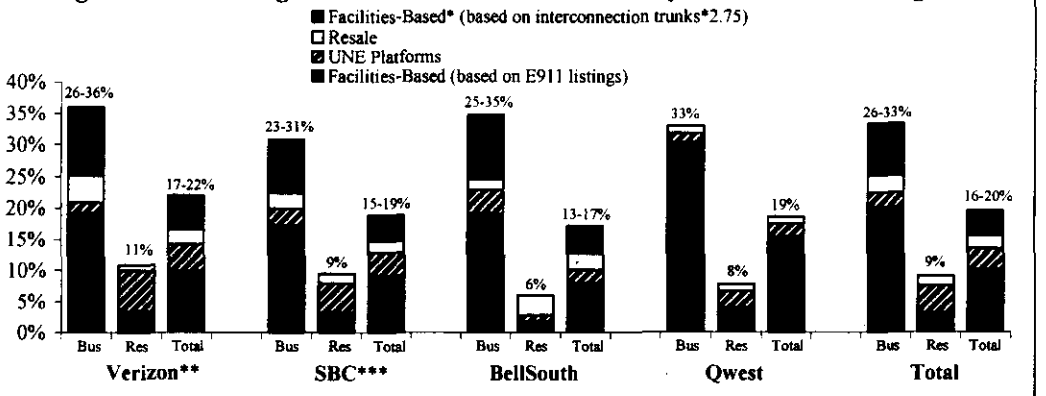
Figure 3. CLEC Access Line Distribution



Source: New Paradigm Resources Group. *See* Appendix M.

The CLECs' share of access lines in BOC regions is at least 16 percent, and likely closer to 20 percent. *See* Figure 4. Their share of BOC residential lines is approximately 9 percent, and their share of BOC business lines is at least 26 percent, and likely closer to 33 percent. In some BOC regions, the CLECs' share of lines is even higher. And, as noted above, at least two-thirds of all CLEC lines are provided wholly or partially over facilities they have deployed themselves.

Figure 4. Percentage of Total Access Lines Served by CLECs in BOC Regions



*The totals for facilities-based lines based on interconnection trunks multiplied by 2.75 represents the additional lines produced by this methodology over the number of E911 listings that CLECs have obtained.
**Verizon data do not include CLEC or ILEC lines in the former GTE service area.
***SBC data do not include CLEC or ILEC lines in Connecticut and Nevada.

Even at their lower end, the totals for facilities-based lines that we report here are considerably higher than the totals that CLECs themselves have reported to the FCC for incorporation into the FCC's February 2002 *Local Telephone Competition Report.* As discussed in Appendix A, however, our low-end totals have been obtained from CLEC-supplied listings in the E911 databases. For obvious reasons, these databases are highly reliable; ILECs and CLECs alike have the strongest possible incentives to maintain them accurately. In filing their line-total reports with the FCC, by contrast, many CLECs do not appear to be following the Commission's express instructions relating to the conversion of high-capacity lines into "voice-grade equivalent lines."[9] In contrast, the CLECs *do* make a distinction between lines and "voice-grade equivalents" in the reports they make to investors and securities regulators. *See* Table 4. The Commission indicates that CLECs *collectively* report serving a total of only 8.6 million lines wholly or partially over their own facilities. Yet AT&T alone has informed the investment community that the company serves "over 30 million" voice-grade equivalent lines over its own network. And 11 other CLECs that report their voice grade equivalent lines to investors have reported serving an additional 125 million voice-grade equivalent lines.

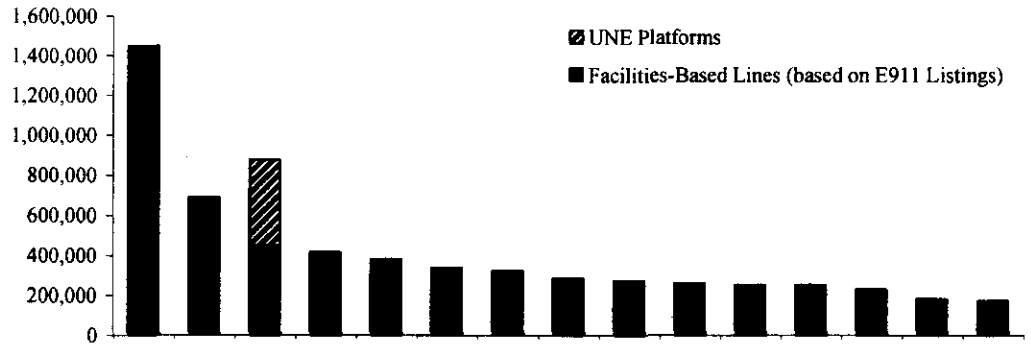
[9] The FCC's instructions specify that carriers are to report "voice-grade *equivalent* lines," which it defines as "a line or channel that directly connects an end user to a carrier and allows the end user to originate and terminate local telephone calls on the public switched network." FCC, *Instructions for the Local Competition and Broadband Reporting Form*, FCC Form 477 at 5-6 (data as of Dec. 31, 2001) (emphasis in original).

Table 4. CLEC Reporting of Voice-Grade Equivalent Lines to Investors		
	CLEC-Reported Totals	
WorldCom	76.4 million	"as of December 31, 2000, our domestic local voice grade equivalents had increased 98% to 65.5 million versus the prior year amount." "Voice Grade Equivalents 2001: **76,415,566**" – WorldCom, Inc., Form 10-K (SEC filed Mar. 13, 2002)
AT&T	>30 million	"Over **30 [million]** DS0 equivalents." – D. Dorman, President, AT&T, *Presentation Before the Lehman Brothers T3 Telecom, Trends & Technology Conference* (Dec. 6, 2001)
XO	21.2 million	"Voice Grade Equivalents (VGE, 64 Kbps capacity), a measure used by XO to evaluate the utilization of its network, grew to **21.2 million** in the fourth quarter of 2001." – XO Comm. Press Release, XO Communications Reports 74 Percent Increase in Annual Revenues and Reduced EBITDA Losses (Feb. 14, 2002)
Time Warner Telecom	16.7 million	"DS-0 Equivalents: **16,736,000**" as of YE01 – Time Warner Telecom Press Release, *Time Warner Telecom Announces Fourth Quarter Results* (Feb. 5, 2002)
Adelphia Bus. Solutions	4.6 million	"Voice Grade Equivalent Circuits: **4,624,032**" – Adelphia Business Solutions, Form 10-Q (SEC filed Nov. 13, 2001)
KMC Telecom	3.6 million	"Total lines (DS-0 equivalents – the combination of access lines and dedicated lines) grew to over **3.6 million** at the end of the third quarter 2001." – KMC Telecom Press Release, *KMC Telecom Reports Financial and Operational Results for the Third Quarter 2001* (Nov. 8, 2001)
Cox	1.8 million	"Voice Grade Equivalent Circuits: **1,773,340**" as of YE01." – Financial Data *attached to* Cox Press Release, *Cox Communications Announces Fourth Quarter Financial Results for 2001* (Feb. 12, 2002)
CTC	589,000	"Access Line Equivalents in Service at **589,000**" as of YE 2001 – CTC Communication Press Release, *CTC Communications Group Announces Fourth Quarter and Year End Results, Restructured Lease Financing Agreement and Amended Bank Facility* (Mar. 7, 2002)
CoreComm/ ATX	495,000	"Toll-related access line equivalents: **495,300**" as of 3Q01 – CoreComm Press Release, *CoreComm Limited Announces Financial Results for the Third Quarter of 2001* (Nov. 14, 2001)
Pac-West	235,000	"Total DS0 equivalent lines in service, which include wholesale and on-network retail DS0 line equivalents, were **235,244** in the fourth quarter of 2001." – Pac-West Press Release, *Pac-West Telecom Announces Fourth Quarter and Year-End 2001 Results* (Feb. 12, 2002)
PaeTec	233,000	"PaeTec . . . has installed **232,848** access line equivalents." – PaeTec Press Release, *PaeTec Exceeds 232,000 Access Lines* (Feb. 5, 2002)
Integra	>120,000	"more than **120,000** ALEs" [access line equivalents] as of YE01 – Integra Press Release, *Integra Telecom Reports Strong 2001 Growth* (Feb. 4, 2002)
Total	**156 million**	

As the totals for facilities-based competition make clear, CLECs have achieved significant economies of scope and scale, and have done so largely without relying on UNEs. More than half of all competitive lines are served entirely over CLECs' own facilities, and nearly two-thirds of competitive lines are served by CLECs' own switches. *See* Figure 1, *supra*. Moreover, these totals demonstrate that CLECs have chosen initially to focus on the most lucrative customer segments, and have therefore made much larger inroads than their count of lines would suggest. Indeed, as discussed below, the CLECs' share of revenues is considerably higher than their share of lines.

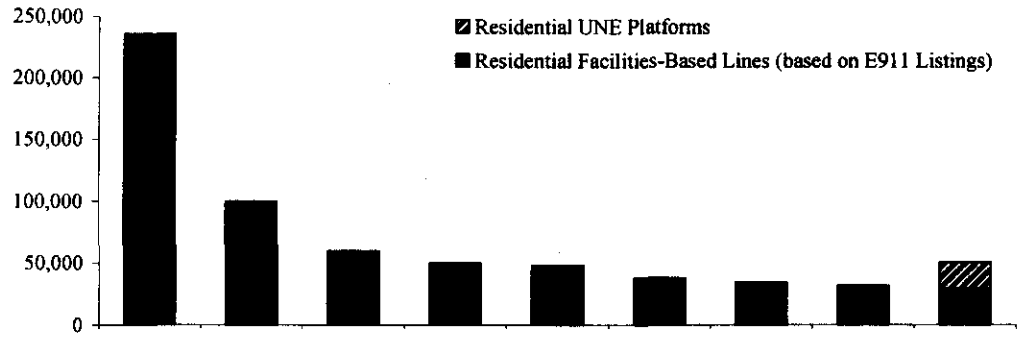
To the extent that CLECs continue to rely on the UNE Platform, market experience demonstrates that they are not migrating UNE-Platform customers to their own facilities to any significant degree (if at all) – despite the fact that they have already deployed the switches they need to do so, and have already built up very large customer bases. *See* Figures 5 & 6.[10] Indeed, many CLECs that have obtained UNE Platforms concede that they have no plans to convert these customers to their own switches. Contrary to the intent of the Commission's unbundling rules, these CLECs are treating UNE-Platform competition as an end in itself, rather than as a stepping stone to facilities-based competition. And in doing so, they are devaluing the efforts of CLECs that have decided to make the investment in facilities-based competition.[11]

Figure 5. Use of UNE Platforms by Top 15 Switch-Based CLECs Other Than AT&T and WorldCom



Top 15 CLECs represented include: Allegiance Telecom, Cablevision Lightpath, Choice One, Cox, Electric Lightwave, Focal Communications, ICG, Intermedia, McLeodUSA, Mpower, Net2000, RCN, Sprint, WinStar, and XO.

Figure 6. Use of UNE Platforms by CLECs Providing Service to 25,000 or More Residential Lines Using Their Own Switches*



*Excludes CLECs providing service over cable facilities. Does not include CLECs in Qwest's region.

CLECs providing service to 25,000 or more facilities-based residential lines include: ALLTEL, Broadview, Cavalier Telephone, Intermedia, Knology, McLeodUSA, RCN, TDS, and TOTALink.

[10] *See* Sections II.A & V.B.

[11] *See* Section V.B.

ILECs are also rapidly losing lines due to competition from wireless and cable providers.[12] Wireless phones compete directly for second lines, and to a lesser (but growing) extent for primary lines. Analysts estimate that about 10 million total access lines were replaced by wireless lines as of year-end 2001. Approximately 70 percent of all residential broadband subscriber lines are provided over cable networks, and two out of every three new broadband subscribers choose cable modem service.

Finally, a great deal more traffic is migrating off of ILEC networks than the migration of lines would indicate.[13] E-mail and instant messaging (IM) now substitute for a large fraction of voice traffic. There are now 900 million e-mail accounts in the U.S. and over 60 million IM users. It is estimated that consumers in the U.S. are sending approximately 3.2 billion e-mail messages and approximately 1 billion IM messages *per day*. If only 10 percent of the 4.2 billion daily e-mail and instant messages substitute for a voice call, that is equivalent to about 750 billion minutes per year, or roughly one-third of all voice traffic that passes through ILEC networks. A large and growing fraction of e-mail and IM traffic originates and/or terminates on competitive networks. And even when carried over ILEC networks, such traffic displaces significant usage-sensitive (*e.g.*, per-minute or per-call) revenues that otherwise would be earned.

C. Capital Investment.

CLECs, wireless carriers, and broadband providers have made enormous capital expenditures to expand the availability of their services.

CLECs have invested about $50 billion in new capital expenditures since the time of the last UNE review three years ago.[14] Significant venture capital has gone into the telecommunications industry.[15] CLECs also have raised large sums from strategic and institutional investors,[16] and have obtained significant additional funding from debt markets.[17]

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[12] *See* Sections II.B & IV.B.

[13] *See* Sections II.B & II.C.

[14] *See* ALTS, *The State of Local Competition 2001* at 20 (Feb. 2001) (citing Paine Webber and NPRG).

[15] In the four full years preceding the *UNE Remand Order*, the telecommunications industry had attracted only $5 billion in venture capital dollars. In 1999 alone, the telecommunications industry raised nearly $8 billion, and in 2000 the industry raised an additional $18 billion. Telecommunications continued to attract significant additional venture capital in 2001, raising nearly $6 billion in venture capital funding. *See* PricewaterhouseCoopers, *PricewaterhouseCoopers/Venture Economics/National Venture Capital Association MoneyTree Survey, Investments by Industry 1995-2001*, http://www.pwcmoneytree.com/PDFS/National%20Aggregate%20Data%2095Q1%20-%2001Q4.xls.

[16] CLECs raised more than $7.4 billion from strategic and institutional investors in 1999, plus another $3 billion in 2000 and 2001. *See* ALTS, *The State of Local Competition 2001* at 17-18 (Feb. 2001) (1999); W.T. Scott, *et al.*, Morgan Stanley, *A Brief Critique – CLEC Events of the Week* at 12 (Dec. 12, 2001) (2000/2001); XO Press Release, *XO Announced $800 Million Equity Investment from Forstmann Little and Telmex* (Nov. 29, 2001); XO Press Release, *XO Reaches Definitive Agreement with Forstmann Little and Telmex* (Jan. 16, 2002). In addition to these totals, Bill Gates's private investment groups have invested $500 million in Cox. *See* Reuters, *Gates Invests $500 Million in Cox*, CNET News.com (Jan. 24, 2002), http://news.com.com/2100-1001-822792.html.

[17] According to one source, CLECs obtained $36 billion in loans in 1999. *See NPRG CLEC Report 2002, 15th ed.*, Ch. 2 at 6.

Initial public offerings by CLECs raised $2.6 billion in 1999 and 2000.[18] CLEC market capitalization has dropped sharply in the past 18-24 months, as it has in most other high-tech sectors. But many CLECs took advantage of the stock bubble, while it lasted, to finance acquisitions, investments, and capital outlays. *See* Table 5. More recently, stronger CLECs have taken advantage of falling stock prices to purchase their weaker siblings at a bargain price.[19]

Much of this competitive investment has gone into building urban fiber networks to serve business customers. But CLECs also have invested a great deal in building out their networks to serve residential customers. Cable operators have already invested at least $8 billion to upgrade their networks to provide telephony services.[20]

Cable operators and other competitive providers also have invested heavily to provide broadband services. The National Cable & Telecommunications Association (NCTA) estimates that the cable industry has invested more than $55 billion "to provide consumers advanced broadband services" since passage of the 1996 Act.[21] Satellite and fixed wireless providers also have made very large investments to provide two-way broadband services.[22]

There has been even more investment in terrestrial wireless facilities. Cumulative capital investment in the wireless industry has jumped from $24 billion at the end of 1995 to $100 billion as of June 2001.[23] Wireless carriers spent more than $18 billion in 2000 alone on network upgrades and expansion.[24] The cumulative capital investment in the wireless network ($100B) is now roughly one-quarter of the cumulative (depreciated) capital investment in the wireline network ($360B).[25] Annual capital spending on the wireless network ($18B) is running at about half of the corresponding figure for the wireline network ($40B), and continues to grow more

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[18] ALTS, *The State of Local Competition 2000* at Graphic D (Feb. 2000); IPO Home, *2000 Year in Review – All 2000 IPOs*, http://www.ipohome.com/marketwatch/review/iporeview.asp?stats=priced.

[19] For example, Time Warner Telecom acquired GST's assets; AT&T acquired NorthPoint's assets; and WorldCom acquired Rhythms's assets. *See* Time Warner Telecom Press Release, *Time Warner Telecom Finalizes Purchase of GST Assets* (Jan. 10, 2001); AT&T News Release, *AT&T Completes Acquisition of NorthPoint Communications* (May 25, 2001); WorldCom Press Release, *WorldCom Closes Rhythms Transaction* (Dec. 5, 2001).

[20] *See, e.g., JP Morgan Cable Industry Report* at 46 & Table 22 (the cost of upgrading a home for circuit-switched cable telephony is $825/line, and there are 10.255 million homes passed by circuit-switched cable telephony).

[21] Letter from Robert Sachs, President & CEO, NCTA, to the Honorable Member of Congress (Feb. 8, 2002).

[22] *See, e.g., Application of EchoStar Communications Corporation, General Motors Corporation, Hughes Electronics Corporation, Transferors, and EchoStar Communications Corporation, Transferee, For Authority to Transfer Control,* Consolidated Application for Authority to Transfer Control at 46, CS Docket No. 01-348 (FCC filed Dec. 3, 2001) ("Each of ECC (EchoStar Communications Corporation) and Hughes has already made significant broadband investments and plans future deployment of additional high speed Internet access.").

[23] *See CTIA's Semi-Annual Wireless Industry Survey Results.*

[24] *See* CTIA, *Telephia Study Finds Outstanding Wireless Network Performance While Industry Experiences Rapid Growth*, http://www.wow-com.com/articles.cfm?ID=553.

[25] *CTIA's Semi-Annual Wireless Industry Survey Results*; *FCC Statistics of Common Carriers* at Table 2.7 (1995-2001 eds.).

rapidly (averaging 35 percent growth each year for the last five years, while wireline investment has grown at an average of 14 percent each year).[26]

Table 5. CLEC Mergers & Acquisition Activity			
Acquirer	**Target**	**Firm Value**	**Date Closed**
NEXTLINK	Concentric Network	$2.2 billion	June 2000
McLeodUSA	SplitRock Services	$1.8 billion	April 2000
CoreComm	ATX	$900 million	September 2000
Advanced Radio Telecom	Broadstream	$365 million	August 2000
Mpower	Primary Network	$145 million	June 2000
Choice One	US XChange	$515 million	August 2000
Covad	BlueStar	$202 million	September 2000
Gabriel	TriVergent		November 2000
Time Warner Telecom	GST	$690 million	January 2001
WorldCom	Intermedia	$5.5 billion	July 2001
McLeodUSA	CapRock	$532 million	December 2000
Hughes Electronics	Telocity	$180 million	April 2001
AT&T	NorthPoint assets	$135 million	May 2001
Allegiance	Coast-to-Coast Communications	$27 million	September 2001
Cavalier Telephone	Conectiv Communications	n/a	November 2001
WorldCom	Rhythms NetConnections	$31 million	December 2001
IDT Corp.	WinStar	$42.5 million	December 2001
Choice One	Fairpoint (comm. assets only)	undisclosed	December 2001
Comcast	AT&T Broadband	$72 billion	announced Dec. 2001
Allegiance	Intermedia Business Internet assets acquired from WorldCom	undisclosed	January 2002
Cavalier Telephone	Net2000 (VA, MD, DC)	$25 million	January 2002
Broadview Networks	Net2000 assets (NY/MA/NJ) acquired from Cavalier	undisclosed	January 2002
New Edge Networks	@Work	$1.5 million	February 2002
Cogent	Allied Riser	n/a	February 2002
Broadview Networks	Network Plus	undisclosed	announced Feb. 2002
Sources: See Appendix M.			

D. Revenues.

Though precise figures of CLEC local revenues are elusive,[27] facilities-based CLECs are now generating substantial revenues. According to New Paradigm Resources Group's *CLEC*

[26] *Compare FCC Statistics of Common Carriers* at Table 2.7 (1995-2001 eds.) *with CTIA's Semi-Annual Wireless Industry Survey Results.*

[27] Many CLECs are not public companies and do not therefore report their revenues to the Securities Exchange Commission. While most CLECs do report revenues to the FCC, the FCC releases this data in only aggregate form. Complicating matters, the revenue categories reported by the FCC have fairly amorphous parameters. For example, it is difficult to distinguish revenues generated from exchange access services from those generated from intraLATA toll and special access services. This is particularly true with respect to those revenues generated by